

# PATENT SPECIFICATION

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## (54) IMPROVEMENTS IN OR RELATING TO ELASTIC FOAMED MATERIALS AND PROCESSES OF PREPARING THEM

(71) We, TARKETT AB, a company  
 duly organized and existing under the laws  
 of Sweden, of 370 14 Ronnebyhamn, Sweden,  
 do hereby declare the invention, for which we  
 pray that a patent may be granted to us,  
 and the method by which it is to be per-  
 formed, to be particularly described in and  
 by the following statement:—

This invention relates to an elastic soft  
 foamed material and a process of preparing  
 it.

In conventional preparation of elastic soft  
 foamed materials, crystalline calcite or dolo-  
 omite as filler is mixed with the basic material,  
 which may be caoutchouc latices, plastic dis-  
 persions, soft polyurethane adducts, PVC  
 plastisols etc., and with the requisite addi-  
 tions, whereupon the composition is expanded,  
 that is, whisked or foamed, until the desired  
 density has been obtained. By increasing the  
 filler content and the expansion it is possible  
 to reduce the cost of the product, which will,  
 however, impair the strength properties of  
 the product. Quality requirements therefore  
 put a limit to these measures.

Since a couple of years, small gas-filled  
 hollow spheres of alumina silicate, so-called  
 microspheres, are available on the market,  
 these microspheres being a constituent part  
 of so-called fly-ash, which is obtained from  
 certain coal-fired power plants. The micro-  
 spheres are defined for the purposes of this  
 specification as having sizes of about 20—300  
 microns, a wall thickness of between 3 and  
 5 microns and a volume weight of 0.3—0.7  
 g/cm<sup>3</sup>. The microspheres have been used  
 as weight lowering agents in curable plastic  
 compositions, concrete, etc.

The object of the present invention is to  
 improve, with the aid of said microspheres,  
 the prior art types of elastic soft foamed  
 materials. 40

According to one aspect of the invention  
 there is provided an elastic foamed material  
 consisting essentially of one or more of natural  
 or synthetic rubber latices, plastic dispersions  
 and polyurethane, together with gas filled  
 hollow microspheres (as herein defined) of  
 aluminium silicate, the material being formed  
 with hollow cells produced by expansion of  
 the material. 45 50

According to another aspect of the inven-  
 tion there is provided a process of prepar-  
 ing material as set out in the preceding para-  
 graph, comprising mixing gas filled hollow  
 microspheres (as herein defined) of aluminium  
 silicate with a liquid of one or more of  
 natural or synthetic rubber latices, plastic dis-  
 persions and polyurethane and whisking the  
 composition to the desired density. 55 60

The invention will be more fully described  
 hereinbelow and with reference to the follow-  
 ing Examples which relate to the prepara-  
 tion of a latex composition in the previously  
 known manner and according to the new pro-  
 cess, as well as to the preparation of poly-  
 vinyl chloride plastisols for mechanical foam-  
 ing in the previously known manner and  
 according to the new process. 65

### EXAMPLE 1 70

Preparation of a latex composition in the  
 previously known manner (recipe A) and  
 according to the new process (recipe B), all  
 parts being given by weight.

	Example of Latex Composition	Recipe A	Recipe B
	Artificial caoutchouc latex (67 percent dry solids content)	100	100
5	Vulcanizing paste (40 percent dry solids content)	55	55
	Natural caoutchouc latex (60 percent dry solids content)	115	115
	Crystalline filler	135	—
	Microspheres as defined above, ceramic	—	100
		—	—
10		405	370
	Foamed to g/liter	380	230

15 The composition is continuously fed to a Eur-O-Matic type foaming machine, in which air is mechanically whisked into the composition. Recipe B which contains spheres of a density of about 0.6 g/cm<sup>3</sup>, yields, after the same amount of air has been whisked in as in recipe A, a foam which is about 150 g lighter per liter.

20 The foam is supplied to a coating machine, in which the foam is applied with the aid of a roll or doctor blade to a web, for instance a textile carpet. The web with the foam is moved for vulcanisation through  
25 ovens having a temperature of about 150°C.

When tested, the foamed material thus prepared proved to have far better mechanical properties, for instance a higher delamination strength.

The quantity of microspheres added may vary and amounts to a maximum of about 60 percent by weight. 30

#### EXAMPLE 2

Preparation of PVC plastisols for mechanical foaming in the previously known manner (recipe A) and according to the new process (recipe B), all parts being given by weight. 35

#### Examples of Polyvinyl Chlorine Plastisols For Mechanical Foaming

		Recipe A	Recipe B
40	Polyvinyl chloride plastisol	100	100
	Plasticizer	60	60
	Stabilizer	2	2
	Foam emulsifier	4	4
	Crystalline filler, for instance calcite	20	—
45	Microspheres as defined above, ceramic	—	20
		—	—
		186	186
	Foamed to g/liter	500	425

50 The plastisol is continuously fed into a Eur-O-Matic or Oakes (Registered Trade Mark) type foaming machine. In this machine air can be whisked into the polyvinyl chloride plastisols because of the existence of foam emulsifiers in the composition. These emulsifiers can be soap or silicon type emulsifiers.

55 Depending upon the formulation of the composition and the amount of air added it is possible to obtain a lighter or a heavier foam. Recipe A includes a normally crystalline filler (density of about 2.6 g/cm<sup>3</sup>) while recipe B  
60 contains microspheres. Because of the lower density of the microspheres (about 0.6 g/cm<sup>3</sup>) recipe B, after whisking with the same amount of air as in recipe A, yields a foam which is about 75 g/liter lighter than the calcite-containing foam according to recipe A.  
65

The mechanical strength of a foam is dependent int. al. on the volume weight and the employed volume of filler. Although the fill volume is higher for the foam contain-

ing microspheres the delamination strength of this foam is twice that of a foam having calcite as filler. The admixture of microsphere thus gives a foam of superior mechanical properties. 70

The quantity of microspheres added may vary and in the present example may amount to a maximum of about 50 percent calculated on the total weight of the composition. 75

#### WHAT WE CLAIM IS:—

1. An elastic foamed material consisting essentially of one or more of natural or synthetic rubber latices, plastic dispersions and polyurethane, together with gas filled hollow microspheres (as herein defined) of aluminium silicate, the material being foamed with hollow cells produced by expansion of the material. 80

2. A material as claimed in claim 1 wherein the dispersion comprises polyvinyl chloride plastisol. 85  
90

3. A process of preparing the material as claimed in claim 1 or claim 2 comprising mixing gas filled hollow microspheres (as herein defined) of aluminium silicate with a liquid of one or more of natural or synthetic rubber latices, plastic dispersions and polyurethane and whisking the composition to the desired density.
- 5
4. A material as claimed in claim 1 substantially as herein described.
- 10
5. A process as claimed in claim 3 substantially as herein described with reference to either of the examples.

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